



● 标准产品规格表 Standard specifications: P138

### 产品特性 Product features

- 高温150度下的耐磨材料。高低温下保持一致的自润滑材料
- 连续使用温度: -40°C/+150°C
- 适合高载下的摆动
- 适合干运行、免维护
- 较高的抗压强度
- Wear resistance material for temperature up to 150 °C. The Features of the material is kept stable either at high or low temperature
- Continuous working temperature: -40°C/+150°C
- Applicable for oscillating under high load
- Maintenance-free dry operation
- High pressure resistance

### 材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB19
颜色 Color	-	-	深灰 Dark grey
密度 Density	ISO1183	g/cm <sup>3</sup>	1.27
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	1.3
最大吸水率 Max. water absorption	ISO62	%	4.5
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.05-0.20
极限PV值 Max. PV value	ITS026	N/mm <sup>2</sup> × m/s	0.60
弯曲模量 Flexural modulus	ISO178	MPa	2800
弯曲强度 Flexural strength	ISO178	MPa	80
最大静载荷 Max. static load	ITS027	MPa	60
最大动载荷 Max. dynamic load	ITS028	MPa	22
邵氏硬度 Shore hardness	ISO868	D	72
连续运行温度 Long-term application temperature	ITS029	°C	+150
短时运行温度 Short-term application temperature	ITS029	°C	+200
最低运行温度 Lowest application temperature	ITS029	°C	-40
导热性 Thermal conductivity	ISO22007	W/m/K	0.25
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	K <sup>-1</sup> × 10 <sup>-5</sup>	10
阻燃等级 Flammability	UL94	Class	HB
体电阻率 Volume resistance	IEC60093	Ω · cm	>10 <sup>13</sup>
面电阻率 Surface resistance	IEC60093	Ω	>10 <sup>11</sup>

\*ITS: CSB内部测试标准 CSB company's internal test standards.

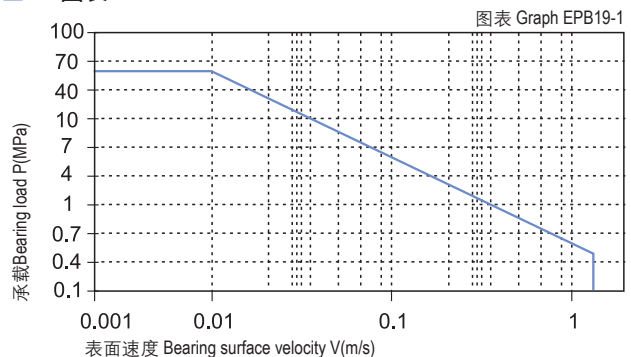
\*\*除非特殊说明测试温度为23°C Test temperatures are 23°C unless otherwise stated.

### 轴承PV值 PV value

CSB-EPB19塑料轴承最大运行PV值为0.6N/mm<sup>2</sup> × m/s; 由此决定轴承所承受的载荷与速度成反比, 详细查阅EPB19-1。

The max PV value of the CSB-EPB19 plastic bearings is 0.6N/mm<sup>2</sup> × m/s which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph EPB19-1).

■ PV图表 Permissible PV value for CSB-EPB19



## 轴承的载荷、速度、温度 Load, speed and temperature

CSB-EPB19塑料轴承可承受最大静载荷为60Mpa，在此载荷下轴承的最大压缩变形量参考EPB19-2，轴承实际工作载荷略小于60Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 1.5m/s) 会导致摩擦温度上升，而温度上升 (Tmax: 150℃) 会导致轴承的承载能力逐渐减弱，载荷随轴承工作温度变化情况参考EPB19-3。

CSB-EPB19 allows the Max static load of 60Mpa, The max compressive deformation rate under the max load is listed in Graph EPB19-2, The actual load capacity of bearing is slightly less than 60Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into higher temperature (Tmax: 150℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB19-3 for such variation.

## 轴承的摩擦系数、磨损、轴材料 Friction factor, wear and shaft material

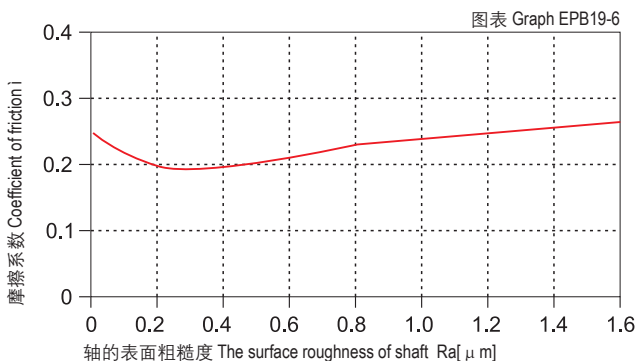
### 摩擦系数 Friction factor

图表EPB19-4表明CSB-EPB19塑料轴承的摩擦系数随着运动速度的变化影响较小，而图表EPB19-5表明CSB-EPB19塑料轴承的摩擦系数随着载荷的增加明显减小，在载荷超过20Mpa是逐渐趋于平稳；图表EPB19-6表明CSB-EPB19塑料轴承的摩擦系数受轴粗糙度的影响也相对比较小；虽然如此，我们还是建议轴的表面不能太光滑，也不能过于出差，推荐使用轴的粗糙度为Ra0.3 ~ 0.6um；

Graph EPB19-4 shows that the friction factor of CSB-EPB19 is not sensitive to the operation speed. Graph EPB19-5 tells that the friction factor of CSB-EPB19 is decreased along with the loading increasing and will be relatively stable when the loading reaches 20 Mpa upwards. Graph EPB19-6 shows that the friction factor of CSB-EPB19 is not sensitive to the shaft surface roughness. Therefore, it is recommended a proper shaft surface roughness in the range of Ra0.3~0.6.

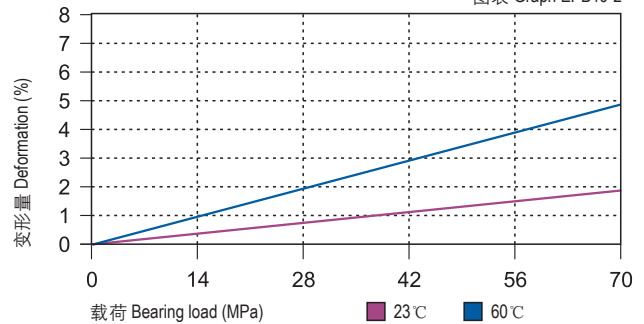
### 摩擦系数与轴表面粗糙度关系图表

Coefficient of friction & the surface roughness of shaft



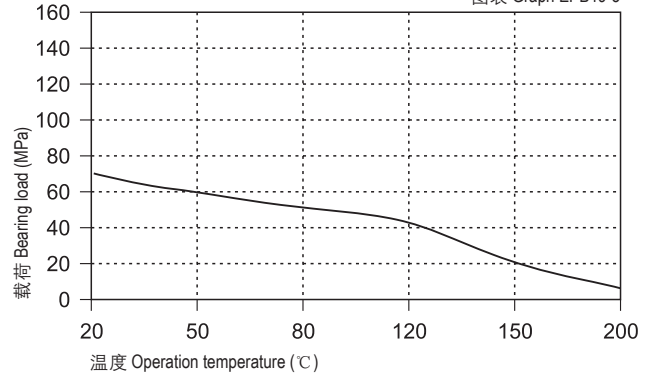
### 载荷-温度-变形量图表 Load-Temperature deformation

图表 Graph EPB19-2



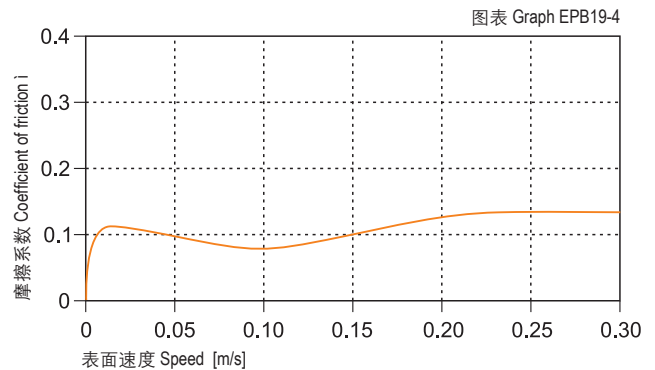
### 载荷-温度图表 Load-Temperature diagrams

图表 Graph EPB19-3



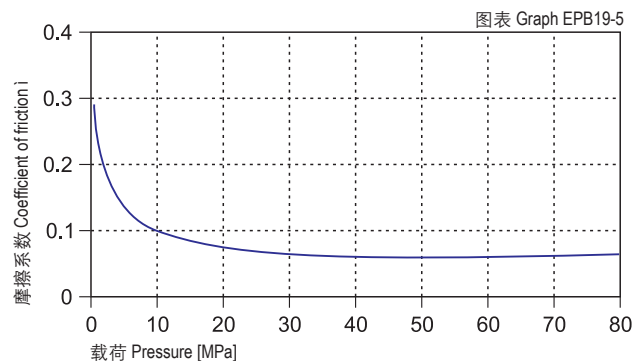
### 摩擦系数与速度变化关系图表 P=2MPa

Coefficient of friction & the speed of bearing, p = 2 MPa



### 摩擦系数与载荷变化关系图表 v=0.2m/s

Coefficient of friction & the pressure of bearing, v = 0.2 m/s



CSB-EPB19	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.05~0.20	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB19-7表明CSB-EPB19塑料轴承在2Mpa下做旋转运动时，磨损随着轴材料的变化较大；通过实验表明CSB-EPB19塑料轴承在做旋转运动时比较适合用于硬轴，高速钢轴和硬铬轴上用于CSB-EPB19塑料轴承能获得良好的运行效果。图表EPB19-8表明硬铬轴更适合用于高载荷下的CSB-EPB19塑料轴承，随着载荷的不断增大，轴承的磨损速率却变化较小。

Graph EPB19-7 shows CSB-EPB19 friction factor is variable against different shaft materials in rotation operation under loading of 2Mpa. Testing indicates that hardened shaft is best for rotation operation of CSB-EPB19. The operation condition is better when CSB-EPB19 is used against hardened steel shafts, high speed steel shaft and hardened chrome steel shaft under rotation operation. Graph EPB19-8x describes that hardened chrome steel is better for this material under high loading operation where as long as the increasing of the loading, the wearing of the bearing is relatively stable.

### 化学抗性 Chemical resistance

CSB-EPB19塑料轴承能抵抗弱碱、弱酸以及各类润滑油的腐蚀。

CSB-EPB19 is good at chemical resistance against mild base, weak acidic medium and various kinds of lubricants.

### 吸水性 Water absorption

CSB-EPB19塑料轴承在标准大气中的吸湿率为1.3%。浸泡在水中最高吸水率为4.5%。由于高吸水率的特性，我们必须考虑此轴承的应用环境。

The moisture absorption of CSB-EPB19 plastic plain bearings is 1.3% in standard atmosphere. The max. water absorption is 4.5% in water. The application environment has to be considered due to the high water absorption properties.

### 抗UV性能 UV resistance

CSB-EPB19塑料轴承长久暴露在紫外线下颜色会发生褪变。材料性能基本都不会发生改变。

The color of CSB-EPB19 could be dimmed when it is exposed into the UV ray. The material performance stays stable.

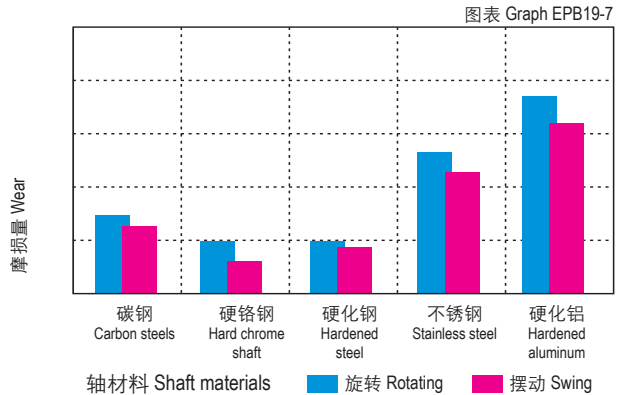
### 安装公差 Installation tolerances

CSB-EPB19塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB19 E10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>0 ~ 3	+0.014 ~ +0.054	0 ~ +0.010	0 ~ -0.025
>3 ~ 6	+0.020 ~ +0.068	0 ~ +0.012	0 ~ -0.030
>6 ~ 10	+0.025 ~ +0.083	0 ~ +0.015	0 ~ -0.036
>10 ~ 18	+0.032 ~ +0.102	0 ~ +0.018	0 ~ -0.043

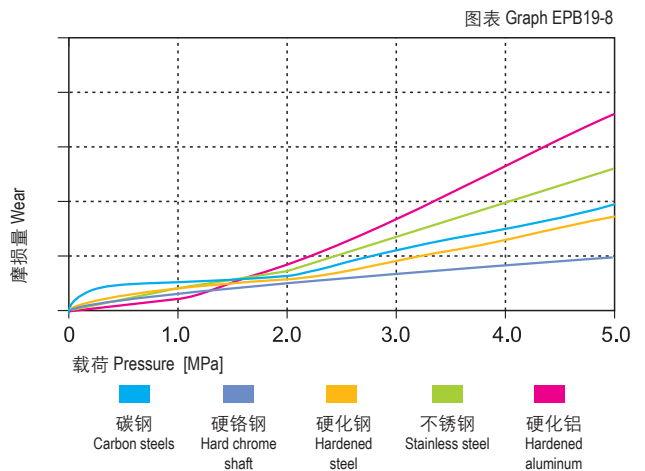
### 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$ , $v=0.2\text{m/s}$

Wear under rotating with different shaft materials,  $p = 2 \text{ MPa}$ ,  $v = 0.2 \text{ m/s}$

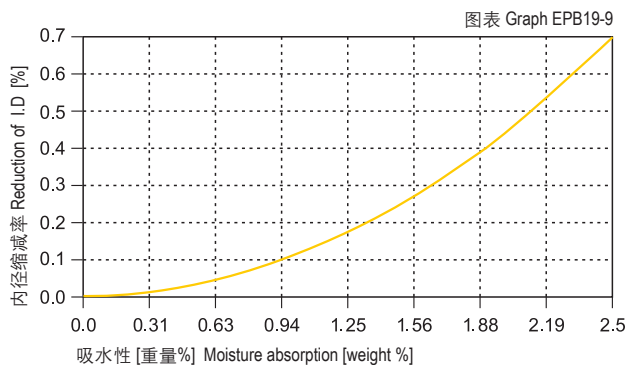


### 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Wear & pressure under rotating with different shaft materials,  $v = 0.2 \text{ m/s}$



### 吸水性的影响 Effect of moisture absorption on EPB19 bearings



直径 Di. [mm]	CSB-EPB19 E10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>18 ~ 30	+0.040 ~ +0.124	0 ~ +0.021	0 ~ -0.052
>30 ~ 50	+0.050 ~ +0.150	0 ~ +0.025	0 ~ -0.062
>50 ~ 80	+0.060 ~ +0.180	0 ~ +0.030	0 ~ -0.074
>80 ~ 120	+0.072 ~ +0.212	0 ~ +0.035	0 ~ -0.087
>120 ~ 180	+0.085 ~ +0.245	0 ~ +0.040	0 ~ -0.100